PBG

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/696,666	10/25/2000	Andy Kahn	103.1049.01	4165

22883 7590 10/29/2004

SWERNOFSKY LAW GROUP PC
P.O. BOX 390013
MOUNTAIN VIEW, CA 94039-0013

EXAMINER	
TORRES, JOSEPH D	
ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 10/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/696,666	KAHN ET AL.	
	Examiner	Art Unit	
	Joseph D. Torres	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-22,24-39,41-51 and 72-85* is/are pending in the application.

4a) Of the above claim(s) *72-85* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-22,24-39 and 41-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-5, 7-22, 24-39 and 41-51, drawn to a mass storage device including one or more disk drives, each disk drive having a plurality of storage blocks, each of said storage blocks including a plurality of sectors; wherein each storage block of said plurality of storage blocks includes a data portion and an error code portion, said data portion storing data for said storage block, and said error code portion including a checksum responsive to said data portion, classified in class 714, subclass 763.

   II. Claims 72-85, drawn to an array of disk drives, each of said disk drives having a plurality of storage blocks for data; parity data for stripes across said array, said parity data stored in said array; classified in class 714, subclass 766.

The inventions are distinct, each from the other because of the following reasons: Inventions Group I and Group II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention Group I has separate utility such as for a mass storage device including one or more disk drives, each disk drive having a plurality of storage blocks, each of said storage blocks

including a plurality of sectors; wherein each storage block of said plurality of storage blocks includes a data portion and an error code portion, said data portion storing data for said storage block, and said error code portion including a checksum responsive to said data portion. In the instant case, invention Group II has separate utility such as for an array of disk drives, each of said disk drives having a plurality of storage blocks for data; parity data for stripes across said array, said parity data stored in said array. See MPEP § 806.05(d).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

During a telephone conversation with Dane Butzer on 21 October 2004 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-5, 7-22, 24-39 and 41-51. Affirmation of this election must be made by applicant in replying to this Office action. Claims 72-85 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Objections

2. Claims 1-5, 7-22 and 24-34 are objected to because of the following informalities: Claims 1 and 18 recite, "An apparatus" in the preamble. CFR § 1.75 states, "The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery". From the preamble, it is unclear as to what claims 1 and 28 are directed. The Examiner suggests: --An apparatus including a means for protecting data from data storage errors--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. Claims 1-5, 7-22, 24-39 and 41-51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites, "a checksum responsive to said data portion". A checksum is data information used for validating a data portion. It is unclear how a checksum data item itself can be responsive to a data portion.

Claim 18 recites, "a first subset of said storage block is responsive to data for said storage block". A first subset is a set containing data elements. It is unclear how a first subset itself can be responsive to data elements that it possibly contains.

Claim 18 recites, "a second subset of said storage block is responsive to error code information". A second subset is a set containing data elements. It is unclear how a second subset itself can be responsive to error code information.

Claim 18 recites, "a checksum responsive to said data". A checksum is data information used for validating data. It is unclear how a checksum data item itself can be responsive to data.

Claim 35 recites, "a checksum responsive to data". A checksum is data information used for validating data. It is unclear how a checksum data item itself can be responsive to data.

Claim 35 recites, "said first subset is responsive to said data". A first subset is a set containing data elements. It is unclear how a first subset itself can be responsive to data elements that it possibly contains.

Claim 35 recites, "said second subset of said storage block is responsive to said error code information". A second subset is a set containing data elements. It is unclear how a second subset itself can be responsive to error code information.

Claims 1-5, 7-22, 24-39 and 41-51 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are as follows:

Claim 1 recites, "a checksum responsive to said data portion". A checksum is data information used for validating a data portion. It is unclear how a checksum data item itself can be responsive to a data portion.

Claim 18 recites, "a first subset of said storage block is responsive to data for said storage block". A first subset is a set containing data elements. It is unclear how a first subset itself can be responsive to data elements that it possibly contains.

Claim 18 recites, "a second subset of said storage block is responsive to error code information". A second subset is a set containing data elements. It is unclear how a second subset itself can be responsive to error code information.

Claim 18 recites, "a checksum responsive to said data". A checksum is data information used for validating data. It is unclear how a checksum data item itself can be responsive to data.

Claim 35 recites, "a checksum responsive to data". A checksum is data information used for validating data. It is unclear how a checksum data item itself can be responsive to data.

Claim 35 recites, "said first subset is responsive to said data". A first subset is a set containing data elements. It is unclear how a first subset itself can be responsive to data elements that it possibly contains.

Claim 35 recites, "said second subset of said storage block is responsive to said error code information". A second subset is a set containing data elements. It is unclear how a second subset itself can be responsive to error code information.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-5, 7-10, 12-22, 24-27, 29-39, 41-44 and 46-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Halford; Robert J. (US 5283791 A) in view of Dewey; Douglas William et al. (US 5864655 A, hereafter referred to as Dewey).

35 U.S.C. 103(a) rejection of claim 1, 18 and 35.

Halford teaches a mass storage device including one or more disk drives (Figure 4 in Halford teaches a mass storage device 108 including one or more disk drives 112a-112g), each disk drive having a plurality of storage blocks (each row in Figure 3 of Halford is a disk storage block comprising 2052 bytes); wherein each storage block of said plurality of storage blocks includes a data portion and an error code portion (each row in Figure 3 of Halford includes a data portion and an Error Correcting Code ECC checksum portion), said data portion storing data for said storage blocks and said error code portion including a checksum responsive to said data portion and wherein parity data is used to correct an error detected using said checksum (col. 4, lines 53-68 and col. 5 lines 1-5 in Halford teach that the ECC checksum is used to correct up to 8 errors and if more than 8 errors are detected, the parity is used to correct the errors; Note: a checksum code can be used to detect up to 16 errors). Note: the terms parity and checksum are generally interchangeable: both refer to systematic error correction/detection codes. Harford uses the term ECC checksum and parity to distinguish between column error correction and row error correction/detection codes. However the ECC checksum in Harford is still parity and the parity in Harford is still a checksum.

However Halford does not explicitly teach the specific use of each of said storage blocks including a plurality of sectors.

Dewey, in an analogous art, teaches each said storage block including a plurality of said sectors (in col. 1, lines 21-23, Dewey teaches that the data blocks making up the parity

group storage block can be sectors but are not limited to being sectors, hence Dewey teaches that each parity group storage block includes a plurality of data block sectors). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Halford with the teachings of Dewey by including use of each of said storage blocks including a plurality of sectors. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of each of said storage blocks including a plurality of sectors would have provided the opportunity to store data of discs using different protocol standards for storing data.

35 U.S.C. 103(a) rejection of claim 2.

See col. 2, lines 64-67 in Dewey.

35 U.S.C. 103(a) rejection of claims 3 and 4.

See col. 1, lines 20-21 in Dewey.

35 U.S.C. 103(a) rejection of claim 5.

In Figure 1B in Dewey, parity portion, P1-P4, is appended to the data portion B1-B20 to form a Parity Group storage block.

35 U.S.C. 103(a) rejection of claims 7, 10, 24, 27, 41 and 44.

Halford and Dewey, substantially teaches the claimed invention described in claims 1-6, 18-23 and 35-40 (as rejected above).

However Halford and Dewey, does not explicitly teach the specific use of a specific size for data and parity blocks.

In col. 1, lines 20-23, Dewey explicitly teaches that blocks are a constant size including but not limited to sector size. Furthermore, in col.4, lines 28-32, Dewey states, "it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention" in recognition of the fact that one of ordinary skill in the art at the time the invention was made such as an engineer can take the various designs in the Dewey patent and implement the designs in an environment having specific design requirements based on sector size, track size, number of disks, available circuitry, etc. without deviating from the scope or the intent of the teachings in the Dewey patent. One of ordinary skill in the art at the time the invention was made would be highly motivated to implement the designs taught in the Dewey patent to gain the benefits taught in the Dewey patent (see col. 1, lines 11-16, Dewey) in a specific environment for which the teachings of Dewey are explicitly designed for.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings in the Halford and Dewey patent by including use of a specific data and checksum block sizes. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of a specific data

and checksum block size would provide the opportunity to implement the design taught in the Dewey patent for a specific environment based on obvious engineering design requirements such as sector size, track size, number of disks, available circuitry, etc.

35 U.S.C. 103(a) rejection of claims 8, 25 and 42.

In Figure 1B in Dewey, parity portion, P1-P4, is appended to the data portion B1-B20 to form a Parity Group storage block. See col. 1, lines 34-37. Note: an exclusive-OR is a checksum operation; hence the block-appended parity is a block-appended checksum.

35 U.S.C. 103(a) rejection of claims 9, 26 and 43.

Figure 5 in Halford teaches additional ECC for checking integrity of data.

35 U.S.C. 103(a) rejection of claims 12-17, 29-34 and 46-51.

One of ordinary skill in the art at the time the invention was made such as an engineer would have been able to take the various designs in the Dewey patent and implement the designs in an environment having specific design requirements based on sector size, track size, number of disks, available circuitry, etc. without deviating from the scope or the intent of the teachings in the Dewey patent (see rejection to claim 7, above).

35 U.S.C. 103(a) rejection of claims 19-22 and 36-39.

Claims 19-22 and 36-39 cite substantially the same language as in claims 2-5, respectively.

5. Claims 11, 28 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Halford; Robert J. (US 5283791 A) and Dewey, Douglas William et al. (US 5864655 A, hereafter referred to as Dewey) in view of Suganuma, Tomoyuki et al. (US 5666511 A, hereafter referred to as Suganuma).

35 U.S.C. 103(a) rejection of claims 11, 28 and 45.

Dewey, substantially teaches the claimed invention described in claims 1-8, 18-25 and 35-42 (as rejected above).

However Dewey, does not explicitly teach the specific use of cache or RAM.

Suganuma, in an analogous art, teaches use of Cache memory (see Cache memory 26 in Figure 11). Suganuma teaches that the cache memory is a component of the RAID controller (col. 11, lines 56-67 in Suganuma) required for operation of a RAID device. In col. 1, lines 45-63, Dewey does not teach the particulars of a RAID controller, however explicitly teaches that a RAID controller is required for operation of a RAID device. The Examiner asserts that use of the particulars of the RAID controller taught in Suganuma would make the required RAID controller of Dewey operational, hence one of ordinary skill in the art at the time the invention was made would be highly motivated to combine Dewey with Suganuma in order to use the device of Dewey.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dewey with the teachings of Suganuma by including use of the controller taught in the Suganuma patent (Note: the controller in Suganuma includes Cache memory). This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of the controller taught in the Suganuma patent would provide the opportunity to implement the design in the Dewey patent by making it operational and to gain the benefits of the teachings in the Dewey patent such as improved data integrity (see col. 1, lines 11-16, Dewey).

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (703) 308-7066. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (703) 305-9595. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Joseph D. Torres, PhD
Art Unit 2133